

ClaimsWhat is claimed is:

1. An optical-based sensor for determining the presence or concentration of an analyte in a medium, said sensor comprising:
 - a substrate, said substrate having a first side and a second side;
 - a first radiation source mounted on the first side of said substrate;
 - a second radiation source mounted on the second side of said substrate;
 - a first detector for detecting radiation incident thereon and generating an electrical signal responsive thereto, said first detector mounted on the first side of said substrate;
 - a second detector for detecting radiation incident thereon and generating an electrical signal responsive thereto, said second detector mounted on the second side of said substrate;
 - a first indicator element having an optical characteristic that is affected by the presence or concentration of an analyte, said first indicator element being positioned to receive radiation from said first radiation source;
 - a second indicator element having an optical characteristic that is affected by the presence or concentration of an analyte, said second indicator element being positioned to receive radiation from said second radiation source; and

wherein said first detector generates an electrical signal responsive to radiation incident thereon emitted by said first indicator element and wherein said second detector generates an electrical signal responsive to radiation incident thereon emitted by said second indicator element.
2. The sensor of claim 1, wherein said first and second radiation sources are LEDs.
3. The sensor of claim 1, wherein said sensor has a sensor body, said sensor body having an outer surface surrounding said sensor body.

4. The sensor of claim 3, wherein said first indicator element includes indicator molecules disposed within a indicator membrane proximate the outer surface of said sensor body, said indicator membrane containing indicator molecules that are affected by the presence or concentration of an analyte and positioned to receive radiation from said radiation source.

5. The sensor of claim 3, wherein said second indicator element includes a reference membrane disposed proximate the outer surface of said sensor body and positioned to receive radiation from said radiation source, said reference membrane containing indicator molecules that are substantially unaffected by the presence or concentration of an analyte.

6. The sensor of claim 3, wherein said second indicator element includes indicator molecules disposed within a indicator membrane proximate the outer surface of said sensor body, said indicator membrane containing indicator molecules that are affected by the presence or concentration of an analyte and positioned to receive radiation from said radiation source.

7. The sensor of claim 4, wherein said second indicator element includes indicator molecules disposed within a indicator membrane proximate the outer surface of said sensor body, said indicator membrane containing indicator molecules that are affected by the presence or concentration of an analyte and positioned to receive radiation from said radiation source.

8. The sensor of claim 7, wherein said indicator molecules from said first and second indicator elements are affected by the presence or concentration of analytes that are different from one another.

9. The sensor of claim 4, wherein the optical characteristics of said indicator molecules vary as a function of the concentration of oxygen.
10. The sensor of claim 4, wherein the optical characteristics of said indicator molecules vary as a function of the concentration of glucose.
11. The sensor of claim 1, wherein said first radiation source and said second radiation source are mounted on opposite sides of said substrate.
12. The sensor of claim 1, wherein said first side of said substrate and said second side of said substrate contain regions that are masked.
13. The sensor of claim 12, wherein said first radiation source and said second radiation source are mounted on the masked regions of the first and second sides of said substrate.
14. The sensor of claim 3, wherein said sensor body is configured such that some of the radiation received by either said first or second photosensitive elements is reflected internally within said sensor body before striking the photosensitive elements.
15. The sensor of claim 3, wherein said sensor body is an optically transmissive sensor body which functions as an optic wave guide.
16. An implantable, biocompatible optical sensor, comprising:
 - a fully enclosed polymer housing;
 - a circuit contained within said housing; and
 - wherein the polymer housing comprises PMMA.

17. The sensor of claim 16, wherein the polymer housing consists essentially of PMMA.
18. The sensor of claim 16, wherein the polymer housing consists of PMMA.